National Institutes of Health

Fact Sheet — *Parkinson's Disease*

Parkinson's disease (PD) is a motor system disorder, resulting from the loss of dopamine-producing brain cells. Patients with more pronounced symptoms have difficulty walking, talking, or completing simple movements.

Thirty Years Ago

- Thirty years ago, approximately 50,000 people in the United States were diagnosed with Parkinson's disease (PD) each year.
- Only one drug – levodopa, a chemical compound that the body can turn into dopamine – was available to treat these people.
- Levodopa helped many patients, but it had a number of complications that developed after long- term use, including uncontrolled movements called dyskinesias, as well as fluctuations in motor function.
- Brain surgery that permanently destroyed regions of tissue believed to be involved in the disease was the only non-drug therapy available at that time.
- Clinicians focused primarily on the motor symptoms of the disease because they were the most responsive to treatment.
- With exceptions like parkinsonism associated with viral infections and a "punch drunk" syndrome exhibited by aging boxers, the origins of PD were mysterious.

Today

- The incidence rate of PD has remained fairly constant over the past 30 years.
- People with PD have many more treatment choices including: better and more varied dopaminergic drugs, amantadine to treat dyskinesias, and deep brain stimulation (DBS), that targets electrical stimulation in specific areas of brain tissue. Clinicians developed DBS based on discoveries about brain circuitrysupported by the National Institutes of Health (NIH).
- Clinicians today have a much deeper appreciation for the importance of non-motor symptoms of PD, such as depression and psychosis, which are difficult to treat but are of significant concern to PD patients.
- The NIH is providing additional attention to the non-motor symptoms of PD by supporting clinical trials and bringing experts together to develop diagnostic criteria for symptoms such as depression and psychosis.
- NIH-supported researchers also continue to expand our understanding of the genetic and environmental causes of PD. Six genes and several neurotoxicants are now linked to the disease, and research in both of these fields is progressing at a rapid pace.

Tomorrow

- The future promises a much more comprehensive approach to PD therapy, involving neuroprotective drugs or gene therapy to protect remaining neurons and slow the disease process and cellular transplants to replace neurons that have degenerated.
- Levodopa and other dopamine replacement therapies may remain an option, but novel methods of drug delivery (already under investigation in NIH-funded studies) may provide people with a more optimal level of function.
- Clinicians may also be able to offer a variety of treatments for non-motor features of PD, and both clinicians and researchers should have a much more complete understanding for the broad effects of PD and the overlap between symptoms of PD and those of related diseases.
- NIH-supported advances in genetics may someday allow researchers to understand who is at risk of developing PD and identify the cellular pathways that are involved in the disease process. Together, these findings will enable people who are at risk to obtain treatment early and will help investigators to develop new treatment strategies for people with both inherited and sporadic forms of PD.
- In the future, researchers will also build on NIH-supported discoveries about the environmental contributors to PD. This information will also help aid clinicians in identifying additional people who are at risk of PD, enabling these individuals to obtain early treatment as well.

- Clinical trials are the culmination of NIH's research efforts, and one of the most promising clinical research goals today is the development of therapies that can slow disease progression by protecting neurons from deterioration. The NIH designed its Neuroprotective Exploratory Trials in PD (NET-PD) program specifically to address this goal.

- The NET-PD program has already facilitated the review of more than 100 drugs, and the NIH will be supporting a large Phase III clinical trial of creatine, the most promising drug examined to date.

- Other NIH-supported trials involve the testing of the antioxidant coenzyme Q10, the fat molecule GM1 ganglioside, and the use of DBS in different brain regions – in order to identify the optimal brain target for stimulation and to provide surgeons with a body of reliable clinical data on which to base their recommendations to patients.